

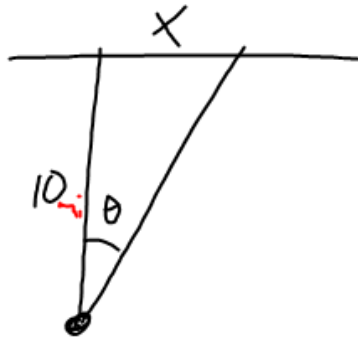
A search light rotates at a rate of 3 revolutions per minute. The beam hits a wall 10 miles away and produces a dot of light that moves horizontally along the wall. How fast is this dot of light moving when the angle θ between the beam and the line through the search light perpendicular to the wall is $\frac{\pi}{6}$?

$$\theta = \frac{\pi}{6}$$

$$x = 10 \tan \theta$$

$$x = \frac{10\sqrt{3}}{3} \text{ miles}$$

$$\theta = \left(\frac{\pi}{6} + 0.01 \right)$$



$$\tan \theta = \frac{x}{10}$$

$$x = 10 \tan \theta \quad \text{--- Dist}$$

$$\frac{dx}{dt} = 10 \sec^2(\theta) \frac{d\theta}{dt} \quad \text{--- rate}$$

$$\frac{dx}{dt} = 10 \sec^2\left(\frac{\pi}{6}\right) (6\pi)$$

$$\approx 251 \text{ miles/min}$$

$$\approx \text{mach 20}$$

HW - Work on the same problems
and try to do a little more

→ set up problems

→ take derivative

- check your answer